Jewett Electrical Actuator

User Manual

Jewett

Index

1. General description

1.1 Application

The JT serial created the absolute new ideal for the actuator which is the essential module of the industrial automation system, it integrated with the MCU , hardware and software together to meet the smart control of the actuators, it accept the control signals from regulators/DCS/PC to respond in action accordingly. It could be applied in the on/off control and regulation control for the valve and fume duct in the industries such as power plant, metallurgy, chemistry, cement and water treatment, with high reliability and various choices on specification, function, accuracy, flexibility & easiness for installation and hook-up.

1.2 Technical feature

- LCD display with back lighting，smart setting for the terminal parameters

- Control signal:4～20mACompatible with Remote integral on/off input

- Position feedback:4～20mA R_L:500 Ω

- High reliability by insulation between the control signal input, valve position feedback and the MCU module, no additional insulator needed.

- Multi-protection for over torque, open circuit, motor over heat, software range setting (details see manual)

- Self-diagnostic

- Power：3 Phases 380V（4 lines）～50Hz ；Single Phase 220V～50Hz

- Ambient temperature： -30～70℃   Relative Humidity: 85%, no erotic gas

- IP65 , meet IEC145

1.3 Structure feature

The electrical actuator includes the motor, gear box, stroke switch, torque protection, servo module, smart setting panel etc.

1.3.1 The motor provides the force to the actuator，it divides into single phase and 3 phases asynchronous motor。It features high initial torque, low start current and less inertia, it also has heat sensitive switch inside which may active.

To enhance the reliability of the actuator, JT series actuator do not adopt the mechanical stopper system, but with electrical stopping module.

1.3.2 The retarder divides into 3 stage（Multi-turn only have 2 stages），the 1st and 2nd stage utilize the small dimension/high ratio/high efficiency galaxy gear box, and the final sage utilize the high decreasing ratio/self-locked cam screw，in case of linear actuator, the cam

screw transfer to linear motion, and in case of quarter turn actuator, the cam screw transfer into angle motion.

1.3.3 The limit switch helps get into preliminary protection program with 2 cam blocks at the end of both directions. The cam blocks are drove by speed-down module, the stroke range may be adjustable by modify the location of the cam block.

1.3.4 The torque limit switch module is configured with the sensor connected to the spring which pressed by the paddle connected to the galaxy wheels, it will be activated only if the springs is out of its torque limitation, and the micro-motion switch will be trigged, the force limitation on the spring is adjustable.

Once the stroke limitation module or the torque limitation module were trigged, theactuator could only turn in reverse direction.

1.3.5 Integrated servo module includes the power, CPU, drive module, position detector, which is the core part of the actuator, its quality truly effected the smooth running of the actuator. JT series actuator was processed, assembled and test under strict quality control.

1.3.6 The setting panel is used for parameters setting function, it's for tuning and test only as an option which may be plugged off after test. One setting panel could be sufficient for test several actuator, it could provide smart setting and solution for failures. The LCD screen used to monitor the running status(input/feedback) and could be used for check the error information with trouble shooting function.

1.4 Servo module schematics.
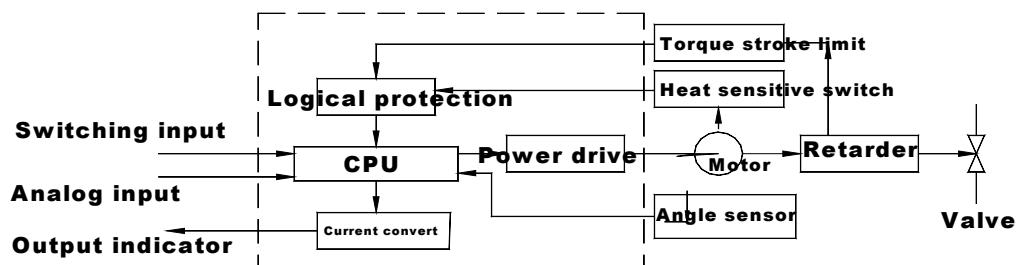
注：analog or switching input were selected on the control panel, the switching mode is activated when it is shorted, and it also could be used as remote control.

2. Quarter turn actuator

2.1 Coding rule

JTA-						Coding rules:	
	□	/				Torque，Unit：10Nm，details see below	
			S			Power supply	1phase ～220V/50Hz
			T				3phases～380V/50Hz
				□		Stroke，Unit：S，details see below	
					D	Installation type	Directly connection
					B		Base fixed

2.2 Quarter turn model and dimension table

Model	Torque（Nm）	Time（S）	Flange				Base		Power		
			Flange ISO	Φ mm	Shape	Weight Kg	Shape	Ball type	Phase	PowerKW	R-speed rpm
JTA-10	100	25	F05/F07	Φ20	Fig.1	7.2	Fig.2	RG-10	S，T	0.025	1400
JTA-25	250	30	F10	Φ28	Fig.3	29	Fig.4	RG-25	S，T	0.065	1400
JTA-60	600	30	F14	Φ35	Fig 5	48	Fig.6	RG-60	S，T	0.16	1400
JTA-100	1000	30 48*	F12	Φ45	Fig. 7	64	Fig.9	RG-100	S，T	0.25	1400
JTA-160	1600	28	F14	Φ60	Fig.7	113	Fig.9	RG-160	T	0.4	1400
		40							S，T	0.25	
JTA-250	2500	28	F16	Φ70	Fig.7	143	Fig.9	RG-250	T	0.65	1400
		40							S，T	0.4	
JTA-400	4000	28	F16	Φ70	Fig.7	145	Fig.9	RG-400	T	1.0	1400
		40*								0.65	
		65							S，T	0.4	1400
		105								0.4	950
JTA-600	6000	40					Fig.8	RG-600	T	1.0	1400
		65								0.65	
		105							S，T	0.4 0.65	
JTA-800	10000	105					Fig.9	RG-800	T	1.0	1400

注：*JTA-600 torque output varies from，0°5000Nm， 45°4000Nm， 90°6000Nm。*

Example： JTA-100/S30B，quarter turn actuator，torque 1000Nm，1 phase，stroke 30s，base mount。

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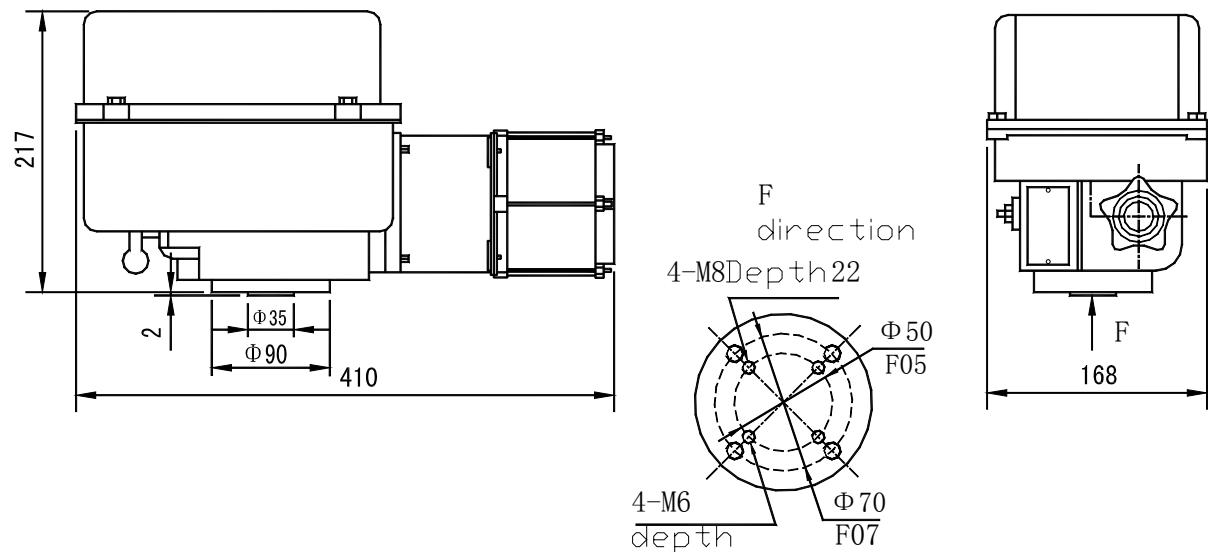
Fig.1   JTA-10 Direct connection
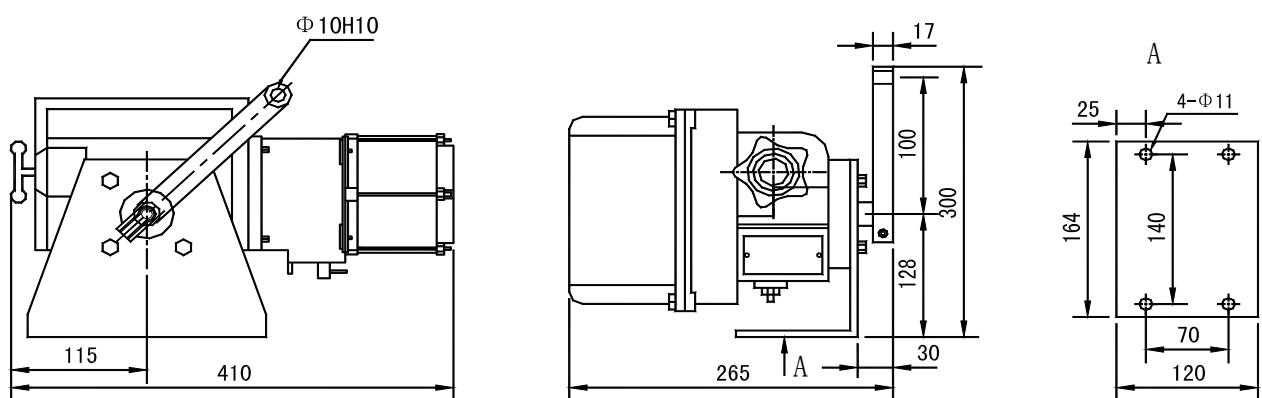


**Fig.2   JTA-10 Base mount**
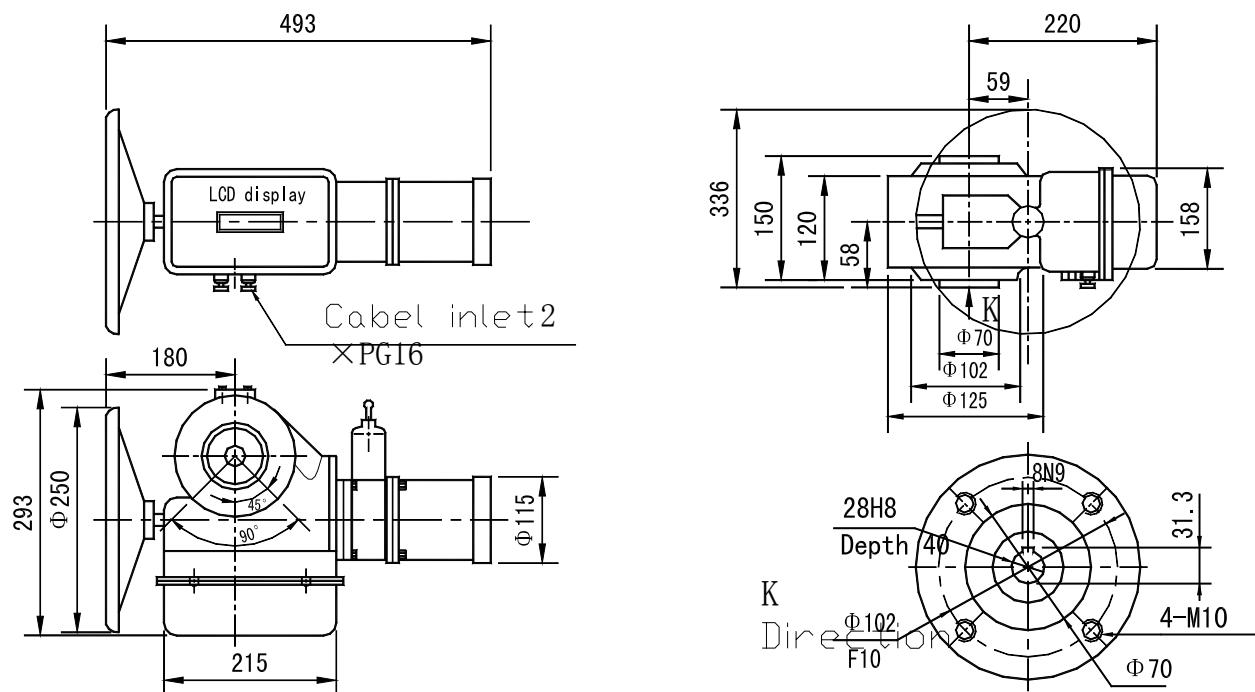
Fig.3   JTA-25 direct connection fig.
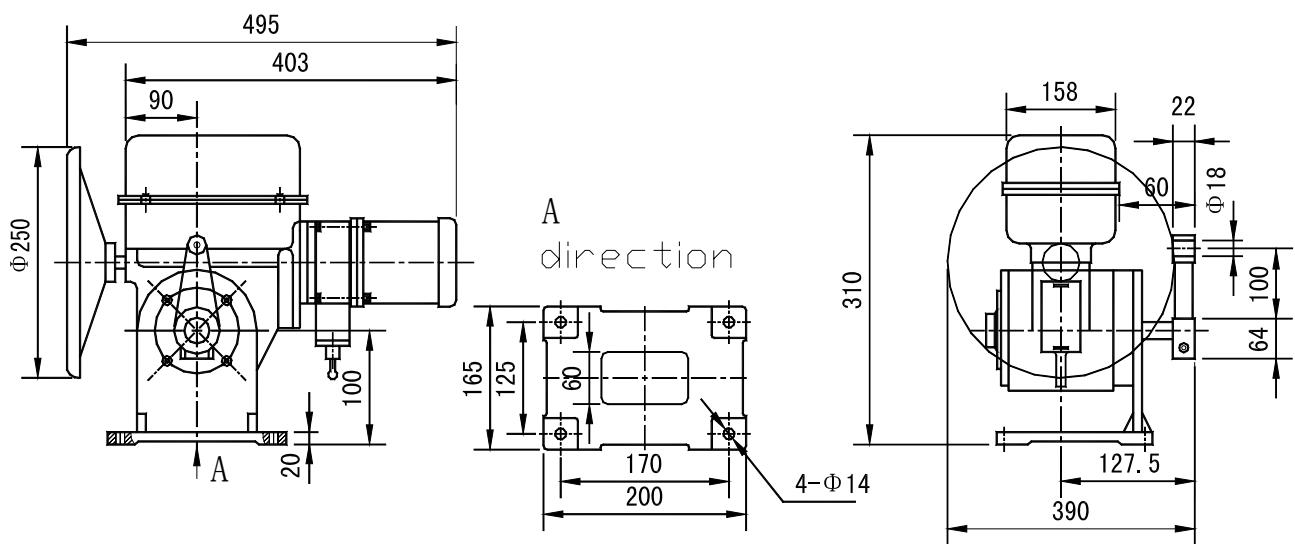
Fig.4   JTA-25 base mount fig.
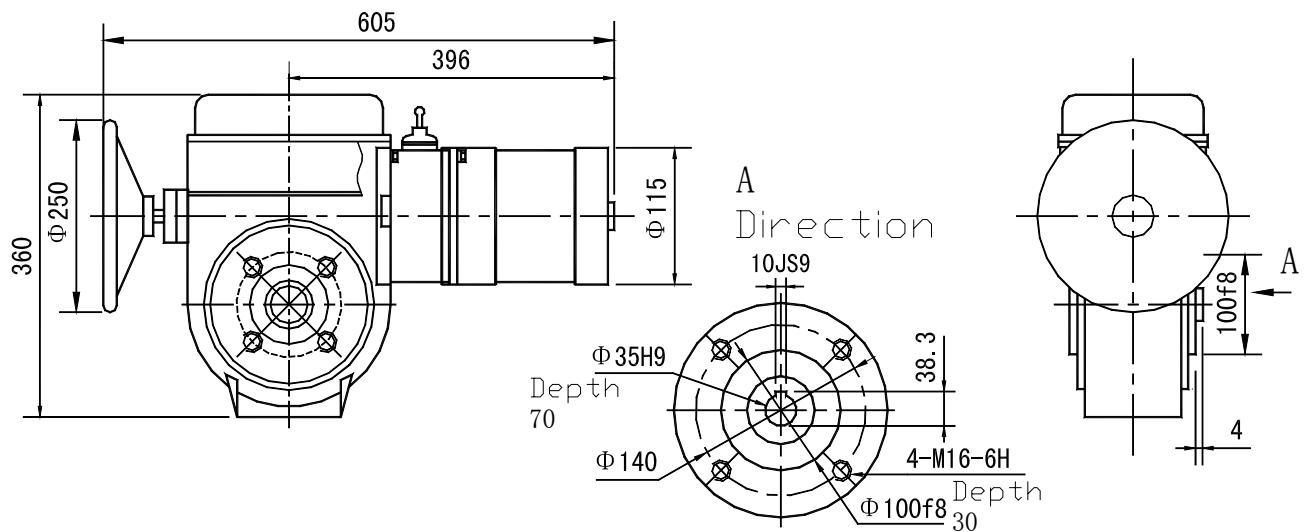
Fig.5   JTA-60directly connection fig.
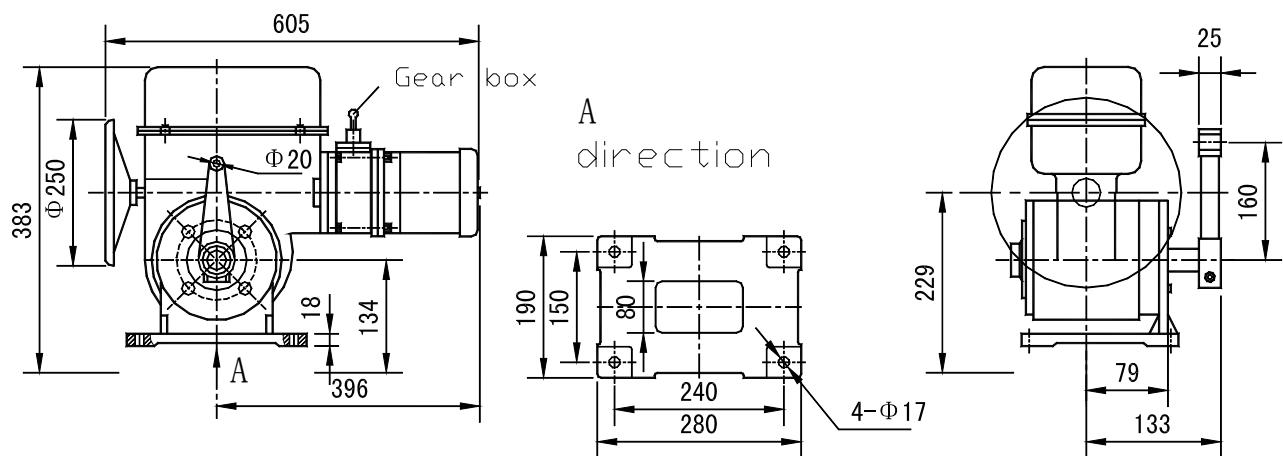
Fig.6   JTA-60 base mount fig.
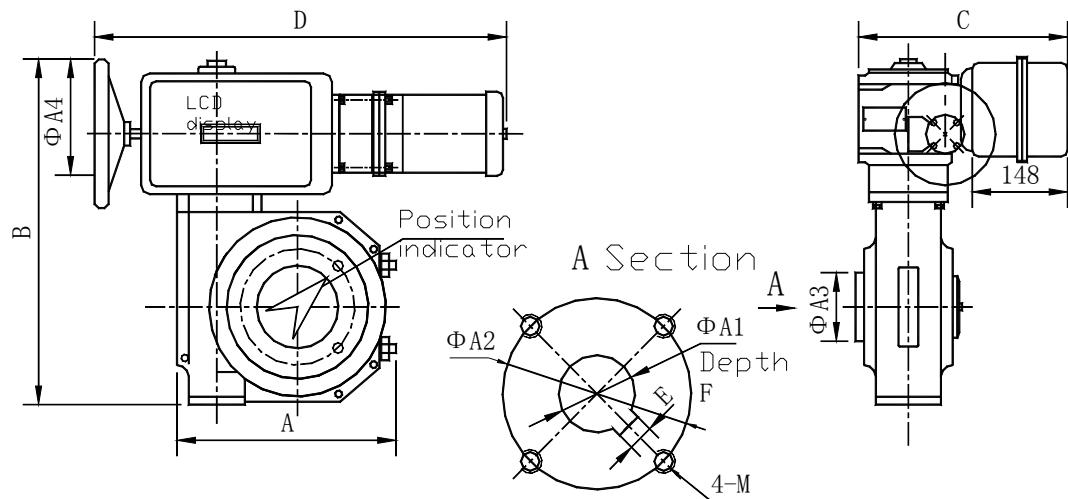
Fig.7   JTA-100，JTA-160，JTA-250，JTA-400 directly connection fig.

JTA-100，JTA-160，JTA-250，JTA-400 actuator（direct connected）dimension table

Model	Flange ISO	A	B	C	D	E Key Slot	Depth F	ΦA1	ΦA2	ΦA3	M	ΦA4
JTA-100	F12	265	408	275	520	14JS9	50	Φ45E8	Φ125	Φ85	M12	160
JTA-160	F14	290	372			18JS9		Φ60E8	Φ140	Φ100	M16	175
JTA-250	F16	395	491	361	612	20JS9	80	Φ70E8	Φ165	Φ130	M20	250
JTA-400		440										
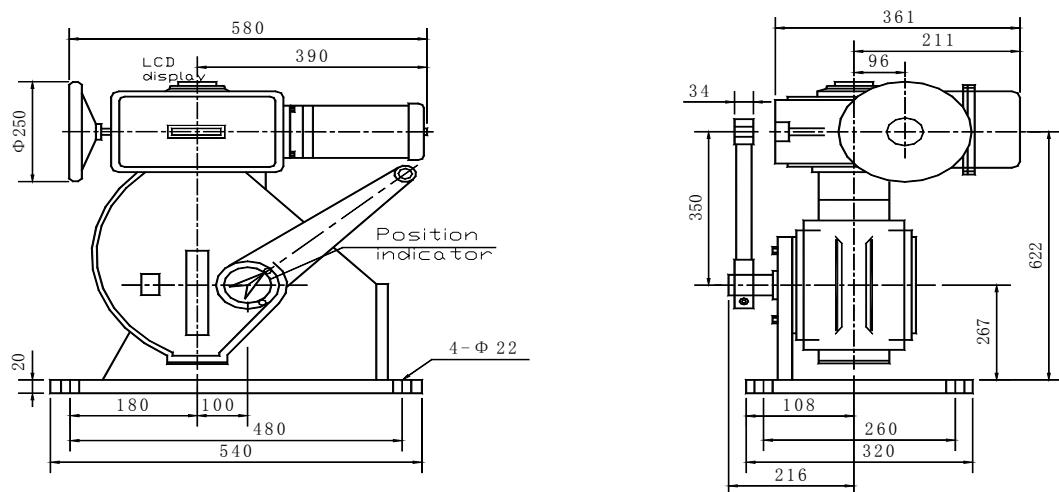
Fig.8　JTA-600 Base fixed shape
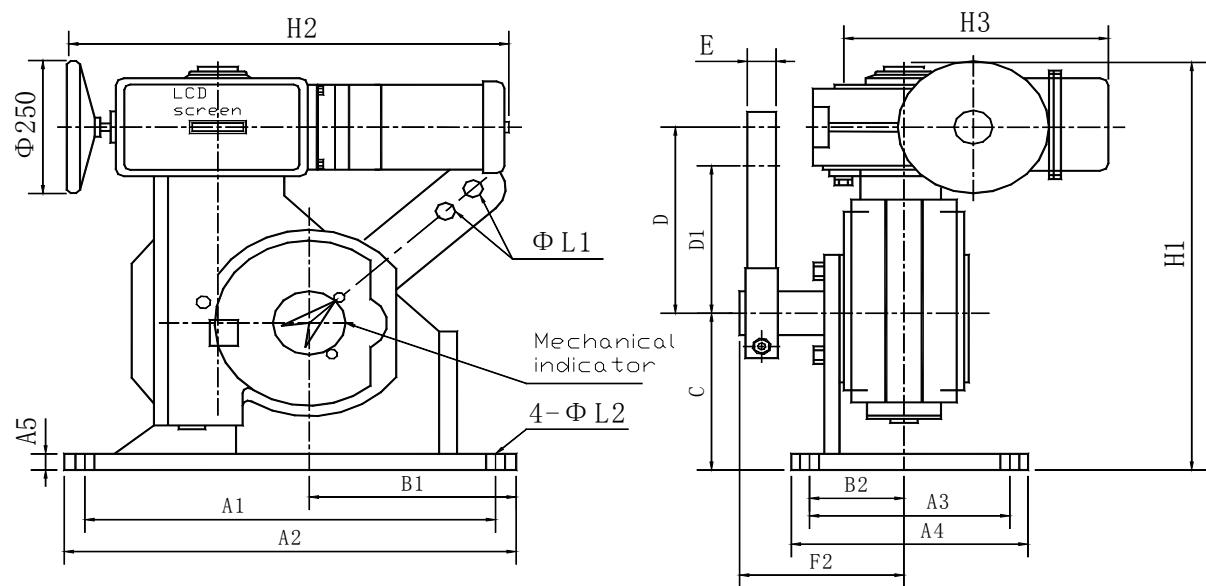
Fig.9　JTA-100，JTA-160，JTA-250，JTA-400，JTA-800 base

JTA-100，JTA-160，JTA-250，JTA-400，JTA-800 actuator（base-mount）dimension table

| Model	A1	A2	A3	A4	A5	B1	B2	C	D1/D	E	F1	F2	H1	H2	H3	ΦL1	ΦL2
JTA-100	240	280	150	190	12	225	45	170		28	40	131	450	510	295	2-Φ20	Φ17
JTA-160	375	435	175	235	18	225	87	170	200/250	30	50	178	517	580	361	2-Φ20	Φ22
JTA-250	500	560	180	240	18	240	97	230	200/250	34	50	170	602	580	361	2-Φ30	Φ22
JTA-400	500	560	180	240	18	240	97	230	200/250	34	50	184	602	612	361	2-Φ30	Φ22
JTA-800	630	700	250	320	40	365	160	370	400	40	80	230	1050			Φ40	Φ32
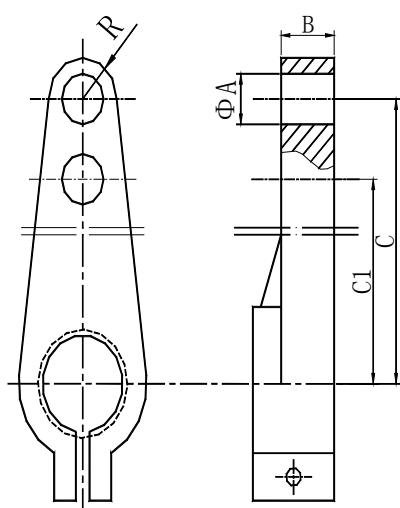
No.	Model	Arm L C/C1	ΦA	B	R
1	JTA-10	100	Φ10H10	17	R20
2	JTA-25	100	Φ18H11	22	R20
3	JTA-60	160	Φ20H11	25	R20
4	JTA-100	250/200	Φ20H10	28	R22
5	JTA-160	250/200	Φ20H11	30	R25
6	JTA-250,400	250/200	Φ30H11	34	R30
7	JTA-600	350	Φ36H10	34	R30
8	JTA-800	400	Φ40H11	40	R35

Fig.10   quarter turn actuator arm connection dimension fig.

3. Linear electrical actuator

3.1 Coding rule

JTV-							Coding	
	□	/					Torqu unit：100Nm	
			S				Power	Single phase～220V/50Hz
			T				supply	Three phases～380V/50Hz
				□□			Speed unit：mm/S	
					□□		Stroke unit：mm	

Example：ModelJTV-64/S1260，linear actuator，single phase，torque6400N，rotation speed1.2mm/sec，stroke

16mm

3.2 Linear electrical actuator fig.
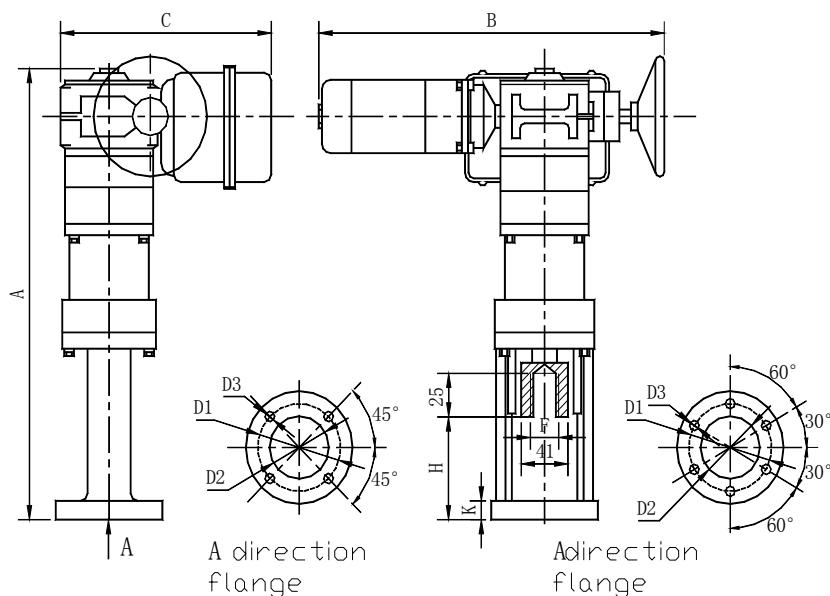
3.3 Linear actuator model and parameter

Model (1phase 220V)	Model (3Phases 380V)	Load N	Stroke mm	Speed mm/S	Connection Diameter F	Flange D1	Flange Inner D2	Connection Hole D3	A	B	H max	K	C
JTV-64/S0610	JTV-64/T0610	6400	10	0.6	M8×1.25	Φ80	Φ60D11	2Hole Φ11	480	407	91	20	
JTV-64/S1210	JTV-64/T1210		10	1.2									
JTV-64/S0616	JTV-64/T0616		16	0.6									
JTV-64/S1216	JTV-64/T1216		16	1.2									
JTV-64/S1816	JTV-64/T1816		16	1.8									
JTV-64/S0625	JTV-64/T0625		25	0.6	M12×1.25	Φ135	Φ80D11		550	460	146	25	
JTV-64/S1225	JTV-64/T1225		25	1.2									
JTV-64/S1825	JTV-64/T1825		25	1.8									
JTV-64/S0640	JTV-64/T0640		40	0.6									
JTV-64/S1240	JTV-64/T1240		40	1.2									
JTV-64/S1840	JTV-64/T1840		40	1.8									
JTV-64/S1260	JTV-64/T1260		60	1.2					591	460	168	30	
JTV-64/S1860	JTV-64/T1860		60	1.8									
JTV-100/S0616	JTV-100/T0616	10000	16	0.6	M16×1.5	Φ118	Φ95D11	4Hole Φ11	480	480	125		280
JTV-100/S0625	JTV-100/T0625		25	0.6							159		
JTV-100/S1225	JTV-100/T1225		25	1.2									
JTV-100/S1825	JTV-100/T1825		25	1.8									
JTV-100/K0640	JTV-100/T0640		40	0.6					550	480	168		
JTV-100/S1240	JTV-100/F1240		40	1.2									
JTV-100/S1840	JTV-100/T1840		40	1.8									
JTV-100/S1260	JTV-100/T1260		60	1.2					591	480			
JTV-100/S1860	JTV-100/T1860		60	1.8									
JTV-160/S1225	JTV-160/T1225	16000	25	1.2	M20×1.5	Φ135	Φ100D11	6Hole Φ18	480	480	234	38	
JTV-160/S1240	JTV-160/T1240		40	1.2									
JTV-160/S1840	JTV-160/T1840		40	1.8									
JTV-160/S1260	JTV-160/T1260		60	1.2					550	480			
JTV-160/S1860	JTV-160/T1860		60	1.8									
JTV-160/S1200	JTV-160/T1200		100	1.2					591	480			
JTV-160/S1800	JTV-160/T1800		100	1.8									
JTV-250/S1240	JTV-250/T1240	25000	40	1.2	M27×2	Φ135	Φ100D11	6Hole Φ18	879	600			380
JTV-250/S1840	JTV-250/T1840		40	1.8									
JTV-250/S1260	JTV-250/T1260		60	1.2						600			
JTV-250/S1860	JTV-250/T1860		60	1.8									
JTV-250/S1200	JTV-250/T1200		100	1.2						600			
JTV-250/S1800	JTV-250/T1800		100	1.8									

4. Multi-turn valve actuator

4.1 Coding rule

JTMA-							Coding	
JTMB-								
	□	/					Torque unit：10Nm	
		S					Power	1 Phase～220V/50Hz
		T					supply	3 Phases～380V/50Hz
			□□				Speed unit：r/min	
				□□			Stroke unit：r（cycle）	

Example： JTMB-15/S1316，single phase power，torque:150Nm，speed：13r/m，stroke:16 cycle

4.2 Multi-turn actuator fig.
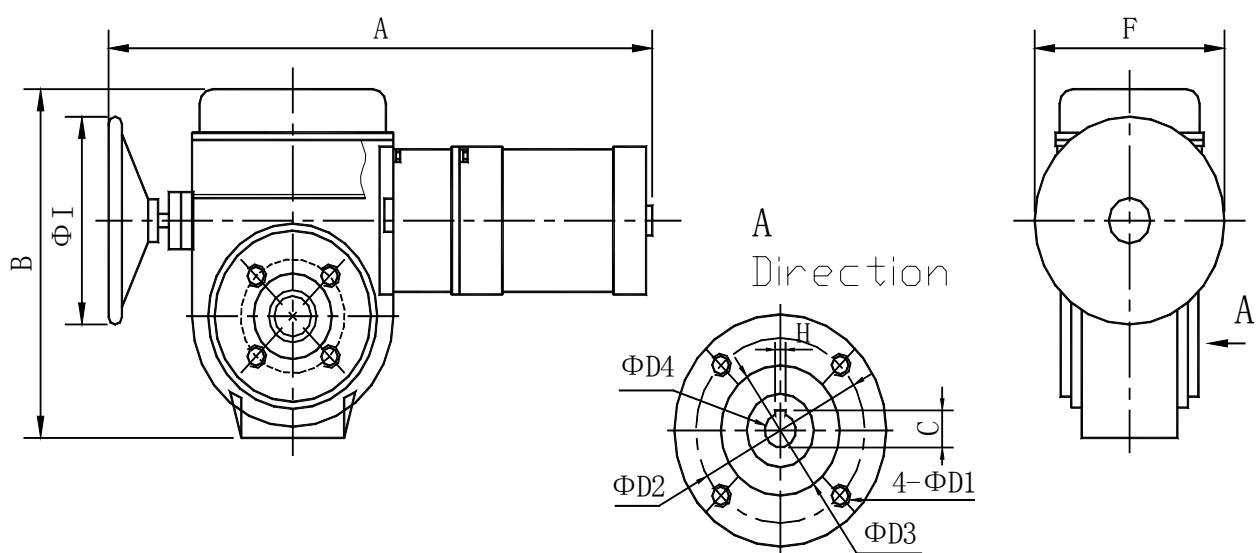
4.3 Mutlti-turn dimension and installation

| Model	Flange	A	B	C	H	ΦD1	ΦD2	ΦI	ΦD3	ΦD4	F
A Multi-turn	F8	440	336	31.3	6N9	M10	Φ85	Φ165	Φ70fb	Φ20 65	350
B Multi-turn	F14	612	360	38.3	8N9	M 16	Φ140	Φ250	Φ100fb	Φ28 81	375

4.4 Multi-turn series

Model		Load Nm	Speed r/min	Strike r（Cycles）
1 Phase220V	3Phases380V			
JTMA-4/S04	JTMA-4/T04	40	4.8	5，7
JTMA-4/S10	JTMA-4/T10		9.6	10，16
JTMA-4/S17	JTMA-4/T17		17.5	17.5，26
JTMA-6/S03	JTMA-6/T03	60	3.3	3.3，5
JTMA-6/S05	JTMA-6/T05		4.8	5，7
JTMA-6/S10	JTMA-6/T10		9.6	10，14
	JTMA-6/T17		17.5	17.5，26
JTMA-10/S03	JTMA-10/T03	100	3.3	3.3，5
JTMA-10/S05	JTMA-10/T05		4.8	5，7
	JTMA-6/T10		9.6	10，14
JTMA-16/S03	JTMA-16/T03	160	3.3	3.3，5
	JTMA-16/T05		4.8	5，7
JTMB-4/S19		40	18.8	15，22.5，34.5，50
JTMB-6/S13		60	13	15，22.5，34.5，50
JTMB-6/S19	JTMB-6/T19		18.8	
JTMB-10/S07		100	7	8.5，15，22.5，34.5，50
JTMB-10/S13	JTMB-10/T13		13	15，22.5，34.5，50
	JTMB-10/T19		18.8	
JTMB-16/S04		160	4.4	5，7.5，11.5，17.5
JTMB-16/S07	JTMB-16/T07		7	8.5，15，22.5，34.5，50
	JTMB-16/T13		13	15，22.5，34.5，50
	JTMB-16/T19		18.8	
JTMB-25/S02		250	2.3	3，5，7.5，11.5，17.5
JTMB-25/S04	JTMB-25/T04		4.4	5，7.5，11.5，17.5
	JTMB-25/T07		7	3.5，15，22.5，34.5，50
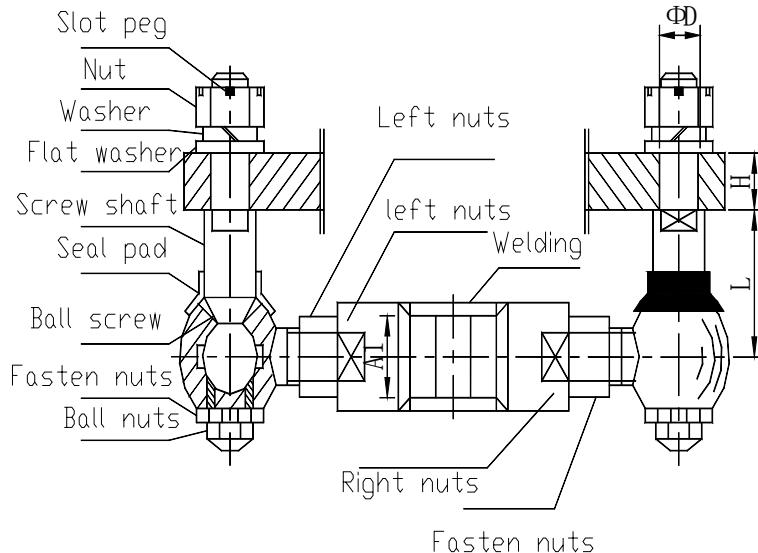
Model	Nm		La	D	H	L	A1
RG-10	100		0~70	10	15	36	29
RG-25	250		0~70	18	22	41	39
RG-60	600		0~100	18	25	41	45
RG-100	1000	25°	0~130	20	28	44	50
RG-160	1600		0~150	20	30	51	50
RG-250/400	4000		0~150	30	34	61	65
RG-600	6000		0~150	36	34	61	72
RG-800	8000		0~150	40	40		

Base mount quarter turn actuator installation fig.

5. Operation manual

5.1 Connecting

All the inner connection have been done before delivery，customer may finish the external connection as fig below. Be careful, the power should be off when connection is making。
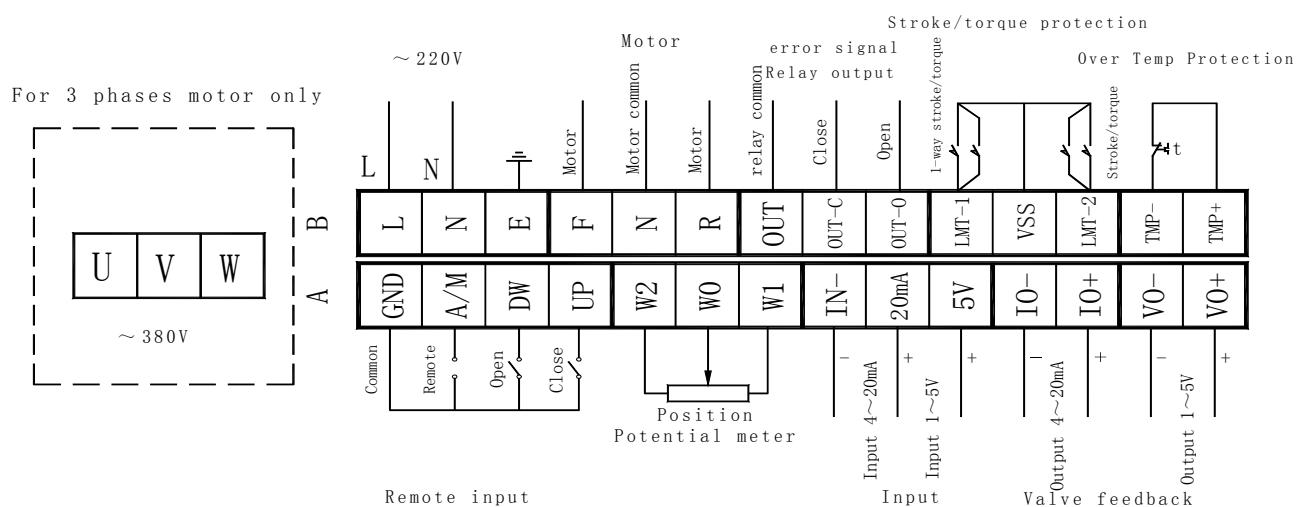
Terminal descriptions

terminal	symbol	description	terminal	symbol	description
A12	IO+	4-20mA current feedback output +	B14	TMP+	Motor temp. switch
A11	IO−	4-20mA current feedback output -	B13	TMP−	Motor temp. switch
A9	20mA	4-20mA current control -	B12	LMT_2	Stroke switch-2 (Off)
A8	IN−	controls signal -	B11	Vss	Stroke switch
A7	W1	potential meter _1	B10	LMT_1	Stroke switch-1(On)
A6	W0	potential meter_	B9	OUT_0	Relay constant open
A5	W2	potential meter_2	B8	OUT_C	Relay constant close
A4	UP	remote control_ UP	B7	OUT	Relay common
A3	DW	remote control_ DOWN	B6	R	AC 220V motor reverse
A2	A/M	auto/manual switch	B5	N	AC 220V motor neutral
A1	GND	ground	B4	F	AC 220Vmotor forward
			B3	E	ground
			B2	N	AC 220V zero
			B1	L	AC 220V fire

Note：The remote control has higher priority than the automatic control, when the control A1 and A2 connected, the auto control was blocked, it only accept the pulse signal to order the valve to open or close.

5.2 Control panel

The LCD screen with back light is used to monitor the input signal and the valve position. In case of error，push→button to check the error information. 。 There are 5 LED indicator，RUN：blink in running and constant light on when error；MANU：manual mode or remote control；AUTO：auto running；R：forward, light on when motion is making；F：reverse, light on when motion is making；5 push bottons，SET：setting the parameters and used as enter；M/A：manual/auto shift；→button：go right；↑button；up or open valve manually；↓button：down，close the valve manually. If the SET button or →button was hold more than 3 seconds, it works as reset function, if want to escape during the setting, you may use it like this way.

5.3 Password setting：（default 555）

Push the M/A button to go into manual mode, then push the set button, display the

SET A, pushe the SET again, display SET B、 SET C; Push the M/A button when the menu is displayed, then you will see the password 555, use →button to move, use ↑↓ to modify. If the password setting is finished, then push the SET button. If you want to return during the setting, please push the M/A button to modify.

Setting menu A: 655

Setting menu B: 556

Setting menu C: factory setting, could not modify by the user.

5.4 Error list: in case of error, the light will turn on, push→button to check the error information as below.

	error	beep	LCD display
1	Motor blocked	4 beeps	Error: Stop Run
2	Out range of input signal	3 beeps	Error: Over Flow
3	Open circuit of input signal	2 beeps	Error: Offline
4	Over temperature	1 beep	Error: HighTmp

5.5 Parameter setting（must be done in the manual mode）

➢ **Menu A, by control panel**

1）choice for input signal，（default is 4~20mA）

　　A1. Input Signal　Type:　　　[4-20mA]

2）idle time from reverse motion　0-9　（default 5）

　　A2.Brk Spac Time(×50ms):　　[5]

3）decimal digits for open percentage（default 1，Max 2）

　　A3. Decimal Digits:　　[1]

4）control mode（the control reaction of 4~20mA）（default is positive），if it is negative mode, that means 4mA is open and the 20mA is close.

　　A4. Control Mode:　　　[Action]　React

5）setting for blocking（default 0.2%），in case of blocking，will test the potential meter.

　　A5. Stop Check Setup (%) :　[0.2]

6）Analog output of the valve position, 4~20mA（default is positive），in case of negative，the clockwise means close in stead of open in the quarter turn actuator.

A6. Output Action：　　[Action]　　React

7）motion range（between two terminal points）, mechanical zero point setting，is reached during the manual mode, it is also limited by the soft limits in the setting, we may reach the mechanical zero point manually, and will remember this point automatically. When you push →button，you will see the current measurement data(last zero point setting), and adjust by push ↑ ↓ button，　and confirm by push the SET button.

A7. Machine Origin Setup(L):　　[0001]

8）Mechanical range between 2 terminal during manually operation, including the soft limit and remote control. With button pushed, it could reach mechanical full open, and record this data. If push →，it will show the current data（last full open data），use ↑ ↓ to adjust the valve position，and push SET to confirm.

A8. Machine Full　Setup(H):　　[1003]

9）Soft zero limit setting（default:1.0 ）

A9. Soft Bounds Origin (%):　　[1.0]

10）Soft full limit setting (default:99.0）

A10. Soft Bounds Full (%):　　[99.0]

11）Electrical brake time scale, N x 10ms，leveled from0-9 (default: 5）,0 means no brake.

A11. Brake Time (x10ms):　　[5]

12）Sensitivity control, （0.01mA-2.00 mA，default:0.1 mA）

A12. Sensitive:　　(0.01-2mA)　　0.1

13）valve block tolerance time setting（0-30sec，default:6sec），it means that if there is no feedback after the setting time that input signal sent, it will alarm the valve blocked and enter into pre-setting(details see Menu B).

A13. Stop Rotate:　　Time(<30s)　　[6]

Notice：If the actuator with the clutch, please do not operate the clutch during the running to let the motor rotate without the loader that the feedback will not be synchronized and it will be regarded as an error, and it will need manually reset to restore.

14）Input signal down limit（default 3.5~20.5 mA，range:0~4 mA）

A14. Input Range　(0-4mA):　　3.5

15）Input signal up limit（default:3.5~20.5 mA，range:0~25 mA）

A15. Input Range　(20-25mA):　　20.5

16）When the input signal out of the range, it will jump to pre-setting(Menu B), and alarm.

A16. Input Over Enable:　[Not] / Yes

If choose NOT, the actuator does not make any action and keep current position, once the error is solved the actuator will restore automatically. If choose YES, it will enter into pre-setting program.(thereafter same)

17）　If the input signal interrupted during the running(=0), the instruction to do（Default: Not，means no output，keep current position and alarm，it will restore automatically once the trouble solved.；If set as Yes，enter into pre-setting(Menu B) and show alarm.

A17. Input Offlin　Enable:　[Not] / Yes

18）Once the motor is over temperature, the instruction to do（default: Not，alarm the contact error，no further action and keep current position，once the temperature low down it will restore automatically. If choose Yes to enter into pre-setting value(Menu B) and show over temperature alarm.

A18. Motor T-Over　Enable:　[Not] / Yes

END，show serial number，setting is ended.

A19. Serial No:　040901

Software setting（Menu B）

1）Pre-setting value for input out of range，open degree（0~100%，default:50，select Menu B4 3& 4）

B1. Input Over　Preset:　50%

2）Pre-setting value for input signal interrupted，open degree（0~100%，default 50，select Menu B5 2&3）

B2. Input Offline　Preset:　50%

3）Valve block solution（default:"1"，stop control output，send contact alarm，it need manually restore after the trouble solved）. It could be restore automatically if it is cause by the mechanical stroke or torque switch after which they are solved.　It could running in reverse direction once the stroke or torque switch was trigged.

B3. Stop Rotate　Premod(2):　1

4）Pre-solution for input signal out of range（default "1"，open to soft fully open，stop output，output　contact error，manually reset after trouble solved. if"2"，restore automatically after trouble solved.（signal restore and not bigger than the set value as in Menu A-15）　if "3"，output contact error, open to designed position（Menu B.1），manually restore after trouble solved. If "4"，output

contact error，open to designed position（Menu B.1），restore automatically once signal is OK.

B4. Input Over　　Premod(4):　　1

6）Pre-solution for signal interrupt（default:"1"，no output，keep position，alarm，manually resetafter trouble solved. if "2"，output contact error，and open to pre-set open degree（Menu B2），manually reset after trouble solved. If "3"，output contact error，open to pre-set open degree(Menu B2)，automatically restore once the signal restored(Menu A14&15).

B5. Input Offline　　Premod(3):　　1

7）pre-solution for over temperature with the motor（default: "1"，alarm contact error，no further output, keep current position，need manually reset after restore. If "2"，alarm contact error，output control signal，restore automatically after temperature low down. If "3"，alarm contact error，output control signal, manually reset is needed after restore.）

B6. Motor T-Over　Premod(3):　　1

8）setting ended

5.6 Installation

First of all, please check all the model/range time/torque/power spec could meet the demands. If quarter turn actuator, please rotate the hand wheel to see it the angel is enough, if not please change the position and fasten the screws, then re-check it. (for the arm angel is less than 120°) If the linear actuator mounted on the valve, rotate the hand wheel to see if the actuator stroke smoothly support with the valve, or it will damage the valve.

Once the stroke range and angel is defined, it need to adjust the range limit. First, open the control box, put out the PCB, use screw driver to adjust the cam wheel (3#, 4#, the start and the end), even if it is not convenient, you may put off the potentiometer，rotate the screw driver to adjust the cam wheel just push to the limit switch. Cam wheel 1&2 used as additional switch. Torque switch is already set before delivery, normally it do not need any on-site adjustment.

Be sure all the internal connection is made and cut off the power supply before connect to the power supply. All the input and output cable should be separate with the other cable or it will influence each other. The signal cable should use the

shield cable with certain grounding. In case of 3 phases motor, the phase sequence should be carefully identified. Even if the clear phase sequence is not much clear, you may use the hand wheel to reach the half open position, then adjust the sequence after power on. The brake function should be set as inactive for 3 phases motor (A11=0), its brake system is functioned by the external circuit, its parameters may set after power-on. If the actuators run reversely with the signal 4～20mA (default set is that clockwise is open for quarter-turn and move-up for linear), you may just set the function A6 as reverse. All the adjustment is a smart operation and need no adjustment on the potentiometer.

Please close the control box and fasten the screws to ensure it is tightly sealed., especially the cable outlet and inlet, or the dust and steam will go into the box to cause the electrical shorts.

Jewett series electrical actuator equipped with the self-lock function, so the motor do not have any mechanical brake. Furthermore, the motor is characterized with it's high quality on tightness. Be sure to coat the sealant after the maintenance of the motor.

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